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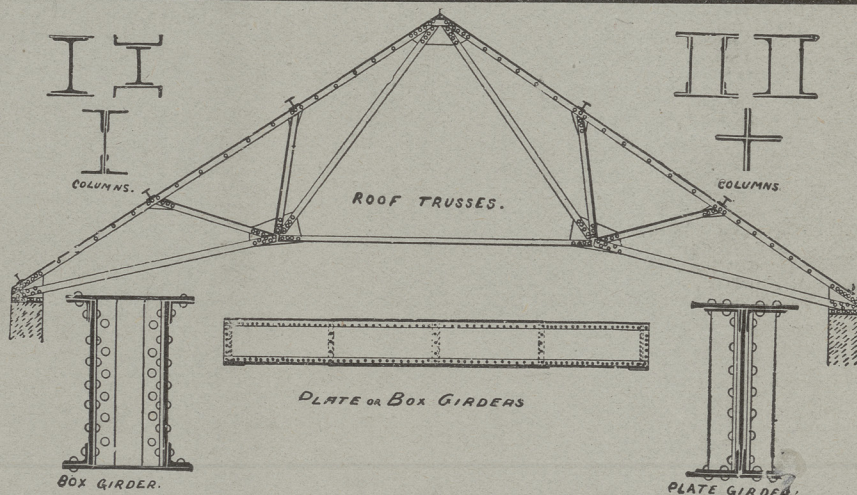
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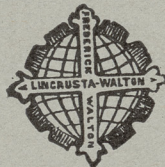
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INDEX TO ADVERTISEMENTS

In the "Canadian Architect and Builder."

Architects.
Ontario Directory.... III
Quebec Directory.... III

Architectural Sculptors and Carvers.
Holbrook & Mollington..... I

Architectural Iron Work.
Canada Foundry Co. 112
Dominion Bridge Co. I
Geo. B. Meadows Co. xiv

Architects' Supplies.
Chas. Potter..... viii

Bridges.
Canadian Bridge Company..... I
Dominion Bridge Co. I
Hamilton Bridge Works Co.... IV

Builders' Supplies.
Alabama Co. I
Luxfer Prism Co., Limited..... xii
Montreal Directory... xvi
Ontario Lime Association..... xvi
Robertson & Co. D. vii
Rice Lewis & Son.... IV
Toronto Directory... xvi

Building Stone Dealers.

Amlherst Red Stone Quarry Co. vii
Credit Forks Stone Co. vii
Broie la vii
Hood & Son..... vii
Kline John..... vii
Horse Shoe Quarry... vii
Robertson & Co., D. vii
Silex Stone Quarries Co. vii
Sackville Free Stone Co. vi
Samuel & Sons, Thos. vii

Builders' Hardware.
Rice Lewis & Son.... IV
Vokes Hardware Co. 112

Bricks.
American Enameled Brick & Tile Co....
Peamsville Brick & Terra Cotta Co.... II
Don Valley Brick Works..... III
Toronto Pressed Brick & Terra Cotta Co.... III
Milton Brick Co. x

Slate.
Steinberger, Hendry Co. viii

Contractors' Plant and Machinery.
Rice Lewis & Son.... IV

Cements.
Owen Sound Portland Cement Co. III
The Rathbun Co.... xiv

Creosote Stains.
Cabot Samuel..... ix
Canada Paint Co.... xi
Zanzibar Paint Co.... 109

Elevators.
Fensom, John..... I
Otis Elevator Co.... I
Malloch & Co. I
Miller Bros. & Toms. viii
Turnbull & Russell Co. V
Williams & Wilson... II

Engravers.
Can. Photo-Eng. Bureau..... ii

Fire-Proof Doors, Etc.
Canada Fire-Proof Door and Shutter Co. v

Folding Partitions.
Springer, O. T. II

Grilles and Railings.
Dennis Wire & Iron Co. viii
Geo. B. Meadows Co. xiv

Granite.
Brunet, Jos. vi

Heating.
Clare Bros. & Co. x
Darling Bros. iii
Gurney, T. den Co. ii
Ives & Co. vi
James Smart Mfg. Co. xiv

Interior Decoration.
Aabastie Co. I
Elliott & Son Co. viii
Geo. Jackson & Sons.. v
Thos. Forster Co. xi

Landscape Architect.
Frederick G. Tedd.. III

Lime.
Ontario Lime Association..... xvi
Robertson & Co. vii

Legal.
Quinn & Morrison.. II

Laundry Machinery.
Troy Laundry Machinery Co. x

Lumber.
Gilmour & Co. iii

Mantels, Grates, and Tiles.
Holbrook & Mollington I
Rice Lewis & Son.... IV

Mail Chutes.
The Cutler Mfg. Co. I

Mouldings.
Boynton & Co.
S. Knechtel Wood Turning Co.... xv

Mortar Colors and Shingle Stains.
Cabot, Samuel..... ix
Muirhead, Andrew.... i
Zanzibar Paint Co. 09

Ornamental Iron Work.
Dennis Wire & Iron Co. viii
Geo. B. Meadows Co. xiv

Painters.
Montreal Directory... xv
Toronto Directory... xv

Prisms.
Luxfer Prism Co., Limited..... viii
Pilkington Br. s. xiv

Paints & Varnishes.
Canada Paint Co. ix
Globe Paint Co. 109
Hollywood Paint Co. xvi
Imperial Varnish & Color Co. 110
Muirhead, Andrew.... i
Zanzibar Paint Co. xiii

Parquetry Floors.
Elliott & Son Co. viii

Plate Glass.
Pilkington Br. s. xiv
The Consolidated Plate Glass Co. II
Toronto Plate Glass Co. viii

Plumbers.
Montreal Directory... xvi
Toronto Directory... xvi

Roofers.
Campbell & Gilday xvi
Duthie & Sons, G. xvi
Douglas B. s. xvi
Forbes Roofing Co. xvi
Nicholson & C., D. xvi
Rennie & Son, Robt. xvi
Ormsby & Co., A. B. I
Rinham, George.. xvi
Stewart & Co. W. T. xvi
Williams & Co., H. xvi

Reflectors.
Frink, I. P. III

Roofing Materials.
Ormsby & Co., A. B. I
Metallic Roofing Co. ix
Philip Carey Mfg. Co. viii
Roofers Supply Co. II
Zanzibar Paint Co. 09

Sash Cord.
Samson Cordage Works xiv

Stained and Deco- tive Glass.
Bloomfield & Son, Henry..... v
Horwood & Sons, H. v
Leonard, B. v
Mackey Stained Glass Co. v
McKenzie's Stained Glass Works v
Pilkington Bros. xiv
St. George, H. E. 112
The Robert McCausland Stained Glass Co. v

Sanitary Supplies.
James Morrison Brass Co. II

Shingles and Siding.
Metallic Roofing Co. ix
Ormsby & Co., A. B. I
Roofers Supply Co. I

Soil Pipe.
Toronto Foundry Co. II

Tubing and Fittings.
Richmond Conduit Co. iii

Tiles.
American Enameled Brick & Tile Co. I
Holbrook & Mollington I

School and Church Furniture.
Globe Furniture Company..... v
Can. Office & School Furniture Co. III

Valves.
Jenkins Bros. IV
Robt. Mitchell Co. xvi

Wall Plaster.
Alabastine Co. I
Albert Mfg. Co. xi

Wire Lathing.
The B. Greening Wire Company..... III
Metallic Roofing Co. ix

Window Cord.
Samson Cordage Works. xiv

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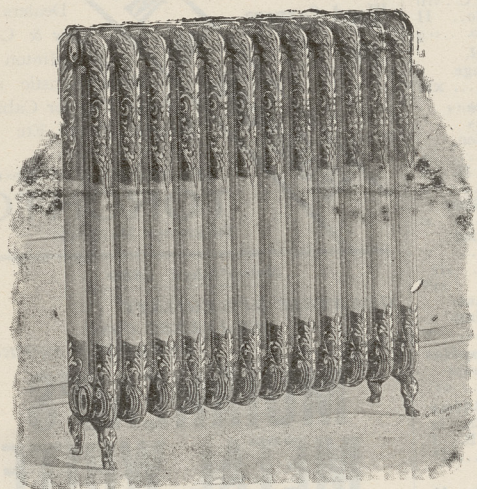
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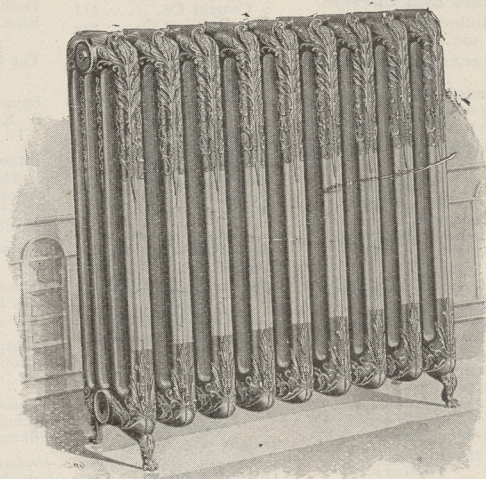
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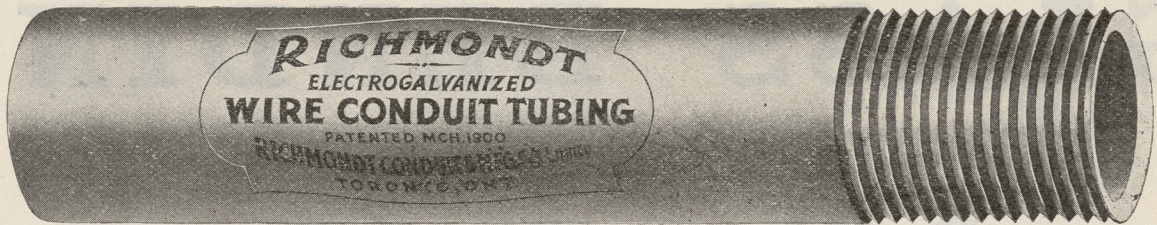
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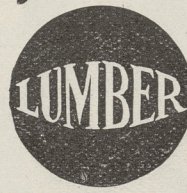
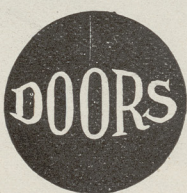
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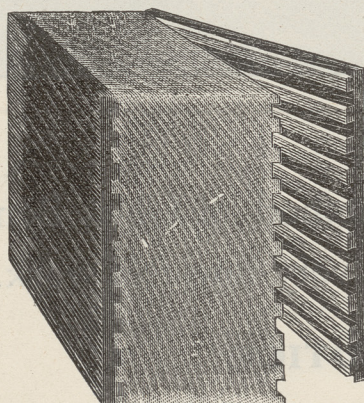
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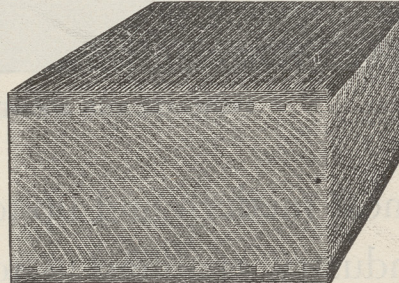
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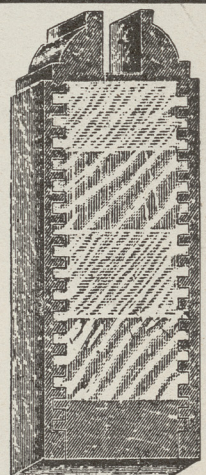


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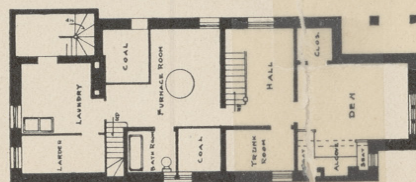
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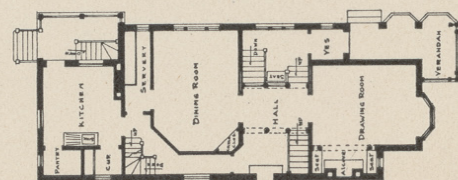
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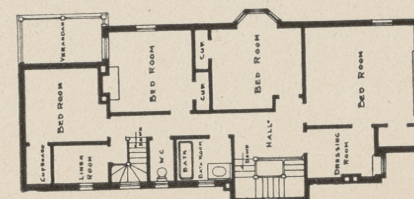
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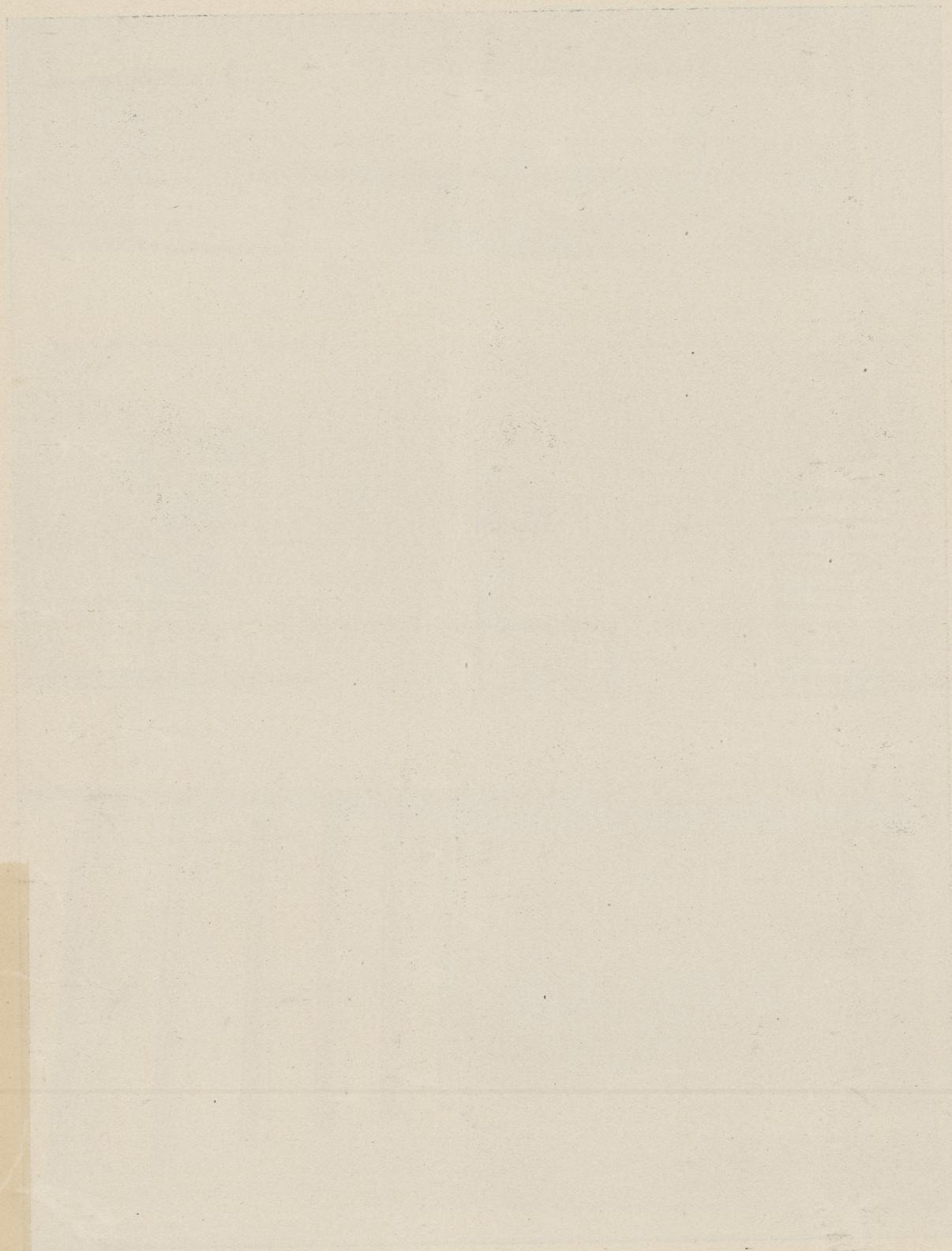


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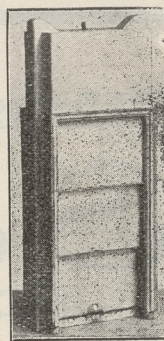
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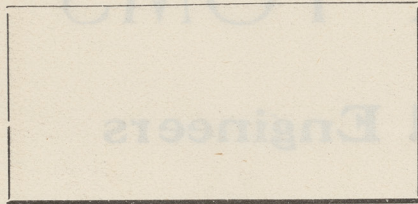
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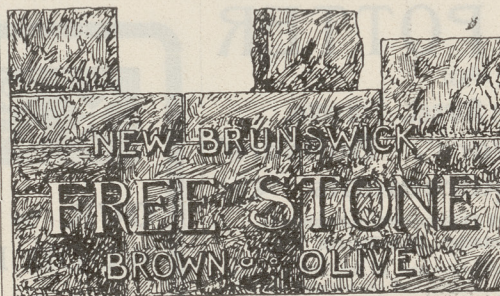
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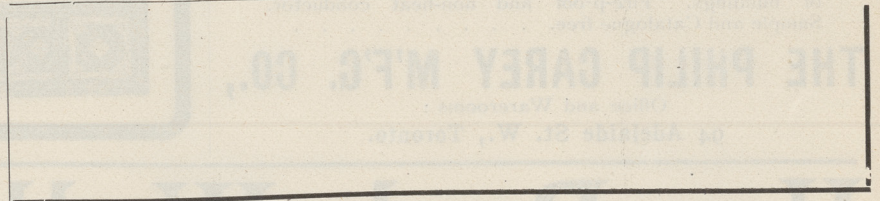
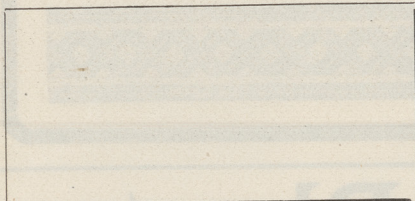
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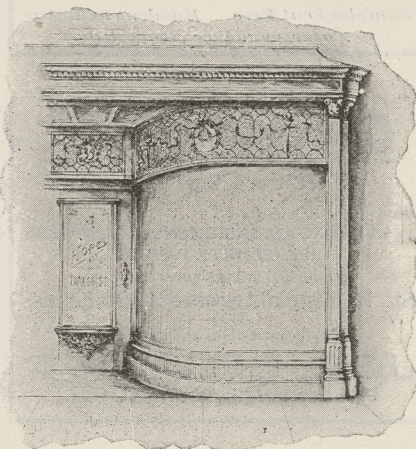
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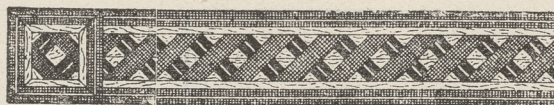
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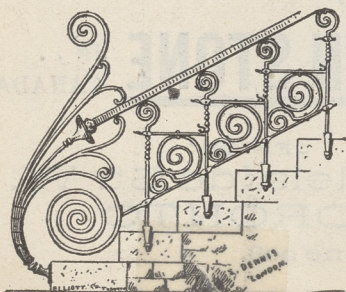
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The Canadian Architect and Builder

VOL. XV.—No. 175.

JULY, 1902.

ILLUSTRATIONS ON SHEETS.

Exterior and Interior Views of Residence of Mrs. Frank Fleming, Bernard Avenue, Toronto.—Bond & Smith, Architects.

ILLUSTRATIONS IN TEXT.

Designs for Buildings for Louisiana Purchase Exhibition, St. Louis.

ADDITIONAL ILLUSTRATIONS IN ARCHITECTS' EDITION.

Two Photogravure Plates—Residence of Mrs. T. M. Harris, St. George Street, Toronto.
Burke & Horwood, Architects.

(NOTE.—Please substitute for above in June number the following :—"Interior of St. George's Hall, Toronto.—
Edwards & Webster, Architects. Residence Bloor Street West, Toronto—Langley & Langley, Architects."

CONTENTS

Editorial	97-98	The Best Flooring for Porches	106
Notes of a Visit to the New Building of the New York Stock Exchange	99-100	Glass Bricks	107
Intercommunication	101	A Suggestion for Builders	107
Protection of Steel and Iron in Bar and Building Construction	102-103	A Forty-One Ton Monolith	107
Expense of Building in Mexico	104	Legal	107
The Wire Saw and Pneumatic Chisel in Stone-Working	104	Building in Montreal	109
Lifting and Underpinning a Nine-Story Wall	105	The Slate Industry of Newfoundland	109
		By the Way	111
		Building Conditions	112

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Toronto City Commissioner.

The City Commissioner's office remains in statu quo for the present but must have a change, soon and the opportunity ought then to be taken to make its organization perfect. An offer has been made by the architects of Toronto to appoint an advisory committee to work with the committee of the City Council charged with the reorganization of this department. The offer was made when it was understood that reorganization was at the point of settlement. The matter was postponed but the offer remains and has been filed for reference. It only remains for some one to see that it is referred to. This is a good offer; one which will introduce into the reorganizing body the technical knowledge that is necessary; and help to make whatever appointment is made a serviceable appointment, settled upon its merits.

The Stability of Walls in Case of Fire.

THE death of five firemen in consequence of a falling wall, at the burning of the warehouse of P. McIntosh & Son, recently in Toronto, shows the need of a provision in the city building law to prevent the construction of walls which are too long for their height and thickness. Walls that depend for their stability upon the stay provided by the floor beams and trusses are a danger in fires. The wall of the old

street car shed, which was occupied by Messrs. McIntosh & Son, should never have been built of so great a length without cross walls. The ruins show a wall 40 feet high, running for 145 paces, or about 425 feet without cross walls. The proper thickness for such a wall would be a little over 3 feet; the actual thickness is 18 inches stiffened by a buttress of 4-inch projection, at intervals varying from 16 to 32 feet. Buttress and all the wall is little more than half thick enough. Such a wall could be safely built only because stayed at intervals by joists and loaded with roof trusses; and, when all these stays are taken away at once, with a shock, in the midst of the violent movements of air in a fire, its downfall is certain. It is not possible to tell from the outside how a long wall is braced; and, unless the chief of the fire brigade is to be familiar with the plans of all buildings, he can never be sure that a long wall is thick enough to stay up after the floors fall in. The by-laws ought to have a provision which will assure him on this point, by making all walls thick enough to stand unsupported.

Are Architects a Commercial Necessity.

A notable instance in Montreal recently of a contract to design and deliver a building for a fixed price, which, in the case in question, appeared to relieve a situation of some difficulty, raises the question whether this would

not be the most direct way for building owners to proceed in all cases; whether it would not be better to make the contractor the responsible person, not the architect. Both functions are necessary; but, if the contractor cannot design himself, he can employ an architect. Would the owner be any the worse for this change of relation between the architect and contractor? Would he not be the better by the disappearance of the uncertainty that now sometimes attends the ultimate price of a building? Why should not buildings be built to order, just as clothes are made to order, for a fixed price? A reputable tailor does not fail us in respect of either design, material or workmanship. It is understood that these qualities are to be assured to us at a fixed price, and the tailor's reputation depends upon the faithful fulfilment of the understanding. Why then cannot a reputable builder be trusted to provide us a building to order upon the same terms? A builder's reputation depends upon his work as much as a tailor's! That is true; but does he depend so much upon his reputation? A tailor's unit of production is small, and its period of duration is short however well it is made. A tailor has to make many many coats before he can make a fortune. Patient continuance in well doing is his only hope for this world as well as for the next. But the contractor!—One good contract scientifically scamped will easily yield a fortune, and the result need not show too soon. What is reputation to a man who can make a fortune before he is found out? Wealth—I speak as a man—is the best reputation. The case of the tailor is not an illustration in point. It is but an illustration of the danger of reasoning from analogy.

The architect is then a commercial necessity, to fix and keep up a good standard of work which, were he not the responsible arbiter, would speedily dwindle. Nor would the architect himself, in these conditions, have the stimulus an artist needs.

The Toronto Plumbers' Strike.

The plumbers of Toronto entered into a wage agreement in 1900, which, according to the conditions of the agreement, is "to stay in force until the first day of January, 1904. And should either party to this agreement wish to change, add to or amend the above, they shall give a least three months' notice in writing prior to the termination of this agreement." The men, after a year of the agreement, have struck for an increase of wages after giving three months notice, and say that this is their interpretation of the above clause. The implication that to express a desire for the termination of an agreement upon a certain date is the same thing as procuring its termination on that date is—considering that the consent of the other party to the agreement is necessary for such termination—a piece of presumption which may be warranted by previous occurrences of the kind; but the only sort of previous occurrence of any kind, that will avail to give this interpretation weight in law, is a judge's decision that the date of the termination of an agreement, which has been fixed by the consent of both parties to the agreement, can be altered at the dictation of one; and the most patient research is not likely to result in the discovery of such a decision in the records of English law. The men have no case, and must know it, because the organizer of their own

union has visited Toronto to tell them so. Their own common sense must tell them that the employers cannot possibly make a second agreement with them, in good faith, upon the basis of this broken agreement. The employers will feel justified, and will be considered by other people to be justified, in breaking the new agreement whenever they find it expedient to do so. In other words, the plumbers' action in this matter is an injury to the steady development of the condition of labor, and the best thing that their own party can do is to make common cause with the employers against them.

Adding to Another Architect's Work.

In France, among architects of the inner circle, not only is a designer's drawing his private property but even, so long as he is alive, his executed conception. If an owner wishes to add to his building with the help of a new architect he must expect a new design, for the new architect would think it an infringement of professional etiquette to repeat an idea developed in his predecessor's work. As an aid to establishing the permanent relation between architect and client that the profession upholds as the ideal, this practice is a good one. An owner will not be so likely to change his architect for trifling reasons. He will be at any rate most likely to put an addition into the hands of the original designer. But as to the question of a substitute architect evading the awkwardness of working with another man's design by diverging from it in the points which distinguish it, the fundamental value of this phase of etiquette is doubtful. Granted that the owner knows and accepts the consequence of a change of architects, and that his interest in the matter need not affect the question; as a matter only of etiquette—if all consideration is to be centred on the original architect, the proprietor of the design—would not his interest be best served by following out his ideas as much as possible in the new work? Variation is competition; and, if the original designer has any proprietary right in the executed design, it ought to be the right to demand its continuation. Etiquette comes in in the maintenance of good relations between the architects. The quarrel, if there is one, is not their quarrel. A superseding architect owes it to his own reputation as well as to the undefined interest which the original architect has in the design to communicate with the original architect, if they are neighbours, in the same town or association. If he does not feel at ease in his position enough to do this, and cannot explain his position, the presumption is that he is a deliberate supplanter; an offender against, not only the original architect of the building, but the whole profession. Of course these remarks do not apply to trifles but to buildings of a certain importance, such as that upon which these remarks are based, which is now being added to in Montreal.

The Campanile of St. Mark's.

As we go to press comes the news that "the detached bell tower of St. Mark's church of Venice which was founded in 888 has collapsed utterly". This can only mean a total fall in some manner and to those who are familiar with the importance of the campanile as a feature, not only in the piazza of St. Mark, but as an essential part of the group of buildings seen from the

lagoon, this piece of news is of far more enduring importance than that of the resignation of Lord Salisbury and the reconstruction of the British Cabinet. The failure of the campanile must be in the foundations which are the ancient part. The shaft and belfry stage are comparatively modern. Some restoration of the foundation was undertaken less than twenty years ago and a piece of one of the piles that was cut was given to a Toronto architect by one of the engineers in charge of the construction. The pile was of oak and the piece taken from it, though showing the structure of wood and the appearance of oak, is almost as hard as stone. The failure of the foundation cannot be due to the failure of the piles themselves, but to some cause of which we await an explanation with the greater anxiety from consideration of the proximity of St. Mark's and the recollection that its original foundation was earlier than that of the campanile.

The Construction of Grand Stands

THE investigation into the cause of the collapse of the Grand Stand during a football match at Glasgow has brought to the surface valuable information with regard to what are the essentials in planning and construction of such structures necessary to insure the safety of the persons who may use them. The problem has become a difficult one in view of the enormous crowds for whom accommodation must be provided. The Grand Stand in Glasgow was an enormous structure, capable of containing 80,000 persons. Unlike the great amphitheatres of ancient times, it was constructed not of solid masonry but principally of wood, steel and concrete. Following are the quantities of material used in its construction: 1,500 lineal yards of fencing, 1,000 tons of concrete for the bedding of the iron girders, twenty-eight miles of pitch pine treads, twelve miles of girders, nine miles of columns, two miles seating, 700 hundred tons of steel, 15,000 square yards tufting, and two miles drain pipes. Between the tiers of seats was a net work of supporting timbers on which the victims of the accident fell and were "broken" in their descent to the ground 40 feet below. The stand appears to have been a substantial affair as such structures go, and the plans were submitted to and approved of by the district surveyor and board. The result has shown, however, that sufficient provision was not made for the tremendous strains imposed by the swaying to and fro within a concentrated area of such an immense assemblage of people. On this point Mr. Edwin O. Sacks, the well-known theatre architect of London, says: "In respect to the terrible accident to the staging at Glasgow, the only thing I should like to observe is that the effect of the moving or live load, such as a crowd of people swaying their bodies but slightly, is enormous, while the effect becomes terribly dangerous when the swaying of the body is accompanied by a shifting of feet. In watching a game in an arena the eyes of every individual in the crowd naturally follow an interesting feature of the game, which may at one time be to the left and at another time to the right of his seat or perch. With the movement of the eyes there is generally a slight movement of the head and upper part of the figure; and at exciting moments the whole body is frequently strained in one or the other direction, and often accompanied by a change of posi-

tion in the feet. This is done rhythmically by thousands at a time, and the movement thus caused is accompanied by the gravest of risks." It may reasonably be expected that the Glasgow tragedy will lead to the exercise of more exact knowledge and greater care in the planning and building of structures of a similar character, not only in Great Britain but throughout the world.

NOTES OF A VISIT TO THE NEW BUILDING OF THE NEW YORK STOCK EXCHANGE.

Anyone looking at the plan of the New York Stock Exchange will see that it is a rectangle with lugs at diagonally opposite corners—N.W. and S.E. The rectangle runs from street to street in its long direction and the lugs are taken out of the lots to the North and South, which are otherwise completely built over.

The lugs are very useful for entrances, elevators, etc., so as to leave the main rectangle clear for the Stock Exchange; and it is this clear area that in considering either design or construction constitutes the building. Both in the foundation and in the upper floors these annexes have no share in the great problems of the building, and while we are considering these problems we may dismiss these annexes and look upon the building as for all practical purposes the great hall of the Stock Exchange which occupies the whole rectangle, 112 by 138 feet, inside measurement, and eighty feet high. The 138 feet run from street to street and the light comes from these ends, through the great portico on Broad Street, that we know from drawings, and a plain colonnade of equal dimensions on the New Street side. In addition to these windows there is a skylight in the ceiling. This is at the bottom of a light well for three or four storeys of administration rooms which, appearing as a blank attic above the Broad Street portico form internally and on the New Street side, well lighted offices. This then is the general scheme of the Stock Exchange; a chamber on the ground floor occupying the whole area; several tiers of offices above, which do not appear in the design; and sufficient basement.

It is the sufficiency of the basement that has required most from the engineer and was the principal object of interest in a visit to the works.

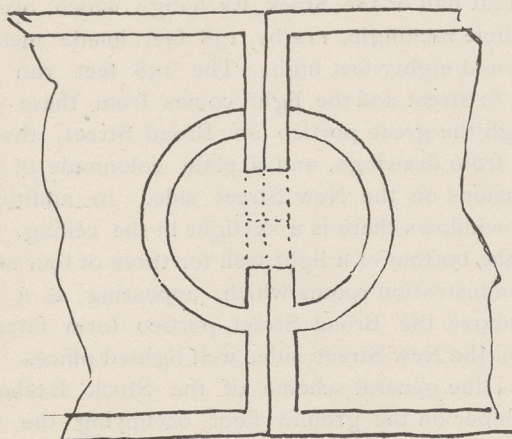
As we entered the building the water level was plainly visible, in a trench along the outside, standing at between 10 and 14 feet below the street level. When therefore we stepped on a wheelbarrow elevator and dropped through three storeys of steel beams, for a distance which we found was 42 feet below the ground line, it was evident that, while the building was classic architecture above the street, it must be something of the nature of naval architecture below. And this we found to be the case.

It has been customary of late in New York to carry the foundation down to the bed rock, either as a continuous wall or in the form of piers, excavating for this purpose, by means of pneumatic caissons, the quicksand that lies above the rock. But the excavation for the cellar has stopped short of the water level, which down town is not very far below the surface. At the site of the Stock Exchange the water level, as has been said, was about 15 feet down. A cellar this depth was not nearly sufficient for the elaborate mechanical are

rangements for heating, ventilation, the supply of power and other purposes which will occupy the basements of the Stock Exchange. It was therefore determined to excavate the whole mass of quicksand and gravel down to the bed rock, which Mr. Amory Coffin, Mr. Post's engineer, decided from borings would be found nearly level at about 50 feet down.

The case was therefore not the ordinary problem of sinking a wall to stand in the water. The wall might in this case be very easily sunk in parts, so as to be in effect continuous piers. Where there was water inside and water outside at the same level, an open joint between the portions of wall would be of no moment. But, when the space inside the walls was to be excavated for some 25 feet below the level of water standing outside, it became necessary to devise some means of locking the sections of wall together so as to make them water tight.

The ordinary pneumatic caisson was used 8½ feet wide (the thickness of the wall) and in 15 foot lengths. The working chamber had a domed steel roof, about 8 feet above the cutting edge, and the air shaft rose from the middle of this. The peculiarity of the caissons was that the ends which were square, the better to facilitate square and true sinking, were false ends. The true end was concave for the middle 4 feet, so that when two caissons were put together a cylindrical



SECTION OF CAISSON END.

space was left to be subsequently filled in with concrete. The square ends were planed and greased and sunk with great care so that the clearance was as little as possible—from ¼ to 2 inches. Then the middle planks (shown by dotted lines), which had been tapered for the purpose, were removed from the square ends, and the joint between the remaining portion of ends which projected into the cylindrical well, caulked and drawn tightly together by means of bolts. This caulked and bolted joint on the outer side of the wall will be always immersed in water and may be relied upon to be permanent and to keep out water as effectually as the caulked joint between the planks of a ship.

Having made the joint between the sections of the wall watertight the next thing was to attend to the close connections of the footing and the rock, so that this junction might be watertight also. To accomplish this the rock bottom inside the caisson was cleaned and washed and a footing of 6 inch concrete upon this was set under air pressure. Then the working chamber was filled with concrete and a thin grout of Portland cement run in and forced everywhere by air pressure until the pressure held for ten minutes at 20 pounds. In this way also the shrinkage in the wall

above the working chamber was made good. Finally the cylinder of concrete connecting the caisson ends of the wall sections was thrown in and the air shaft filled up.

The result has been satisfactory. There is a certain amount of seepage, which is collected in a pit sunk below the cellar bottom and pumped up to the drain.

The deep cellar thus obtained has three storeys below the street level, and Mr. Coffin has made use of these floors as struts to brace his concrete wall against the heavy pressure from without. In order to do this effectually caissons for the 37 steel columns upon which the floor of the Stock Exchange and the three floors below are carried, were sunk down to the rock, and the columns were built in them, while the walls, which have been described above, were being sunk. Thus the walls and columns were both in place before the excavation was begun, and, as soon as the excavation got down to the level of a floor, the floor framing was inserted, and stayed the external walls in place of the stuff which had been removed. The central bays of the floor frame are well cross braced to form an immoveable abutment for the external bays to thrust against, and the ends of the external girders are fitted to a brace girdle of heavy I beams, set with the web horizontal.

The space thus procured under the ground floor is all wanted. The four floors are called respectively the basement, cellar and first and second sub-basements. In the sub-basements are the boilers and engines, the heating, cooling and ventilating plants. The cellar seemed to be chiefly valuable as a free place to run the innumerable wires and pneumatic tubes which are necessary for the elaborate contrivance for saving and expediting work in the Stock Exchange. There is also on this floor a large safe deposit vault, which was a problem by itself. The original vault was of stone. It was determined to leave this as it was, and the caisson sinking and excavation went on around and under it, leaving the vault and an enclosed passageway of approach undisturbed so that its business went on as usual all through the building operations. When it was finally decided to substitute for it a steel vault, the new vault was built alongside; and the move from one vault to another made between Saturday afternoon and Monday morning, so that the vault was not out of working order for an hour.

The cellar and sub-basements set free the basement, or storey on a level with the street, for the telegraph offices, locker and toilet rooms and other supplementary needs of the Stock Exchange, so that the main floor and entrance may be kept free for members. The two or three hundred employees will have a basement entrance of their own and basement passages to their elevators, so that the employees and members need never meet in coming and going and, as far as planning can bring it about, the Stock Exchange will go about its business in a dignified manner.

The great room of the Stock Exchange is chiefly remarkable, in point of constructional detail showing in its unfinished state, for the trusses of 112 feet span to carry the four storeys of offices on each side of the light wall. The trusses are therefore on each side of the skylight in pairs, each 15 feet deep and 4 feet wide on the flange. Being 80 feet high they do not look excessive.

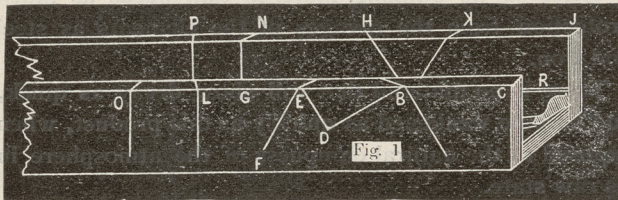
The entire walls were being covered with marble when we were there. The entire space behind the columns of the portico is to be filled with plate glass. For this purpose steel mullions are inserted behind the columns. The mullions are supported from above and, as there is a large surface of wind pressure to resist, they are made of 18 inch I beams.

When the marble and the glass and the ceiling finish are in place one will have to go far to find one single room so large and fine as this.

INTERCOMMUNICATION.

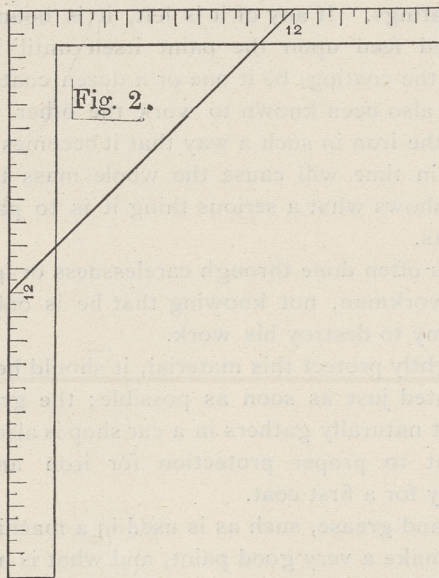
[Communications sent to this department must be addressed to the editor with the name and address of the sender attached not necessarily for publication. The editor does not hold himself responsible for the expressions or opinions of correspondents, but will, nevertheless, endeavor to secure correct replies to queries sent in. We do not guarantee answers to all queries neither do we undertake to answer questions in issue following their appearance.]

From Contracting Mason :—Having some underpinning to do in ordinary brick wall which stands on the side of a hill, I should like to know which is consider-



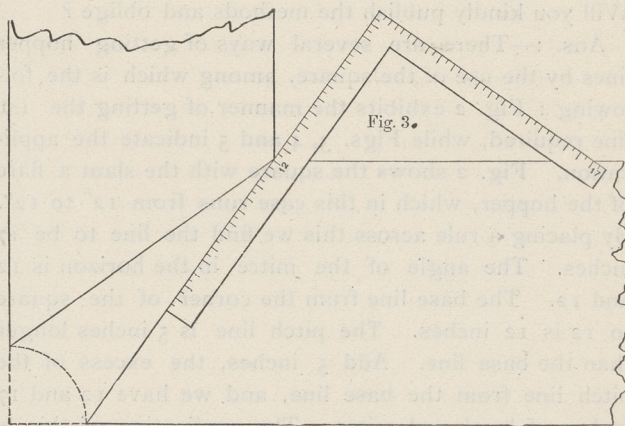
ed the best method of doing the work? Will it be better to use hard burned bricks—which I would prefer—or quarried stones for the work?

Answer :— Walls may be very effectively underpinned with bricks set in Portland cement mortar. A good method of doing the work would be as follows : Cut out a space say 3 feet wide at the base, gradually reducing the width to the height at which it is proposed the new work shall reach. Now excavate the foundations and commence the brickwork, inserting a damp course of some kind above the level of the ground. In a case of this kind, slate bedded in cement would form a pretty effective damp course, but better perhaps would be vitrified stoneware in blocks. Proceed to build up a piece of wall 3 feet long, leaving toothings at the ends, and cutting away the adjoining brickwork as the work proceeds. If considered necessary, hoop-iron bond may be inserted, the ends being bent over. The two top corners of bricks should be “headers” and made to taper about half an inch. These will form a pair of counter wedges, and a space should be left at the top of the new brickwork so that these taper



bricks may be driven in between the new and the old work with but a small amount of cement between them. For a 14 inch wall a brick and a half will require tapering, and for an 18 inch wall two bricks will be wanted, and these must be driven in tight from both sides. These when driven in tightly, will be found much more effective than wedging with slate or tile. All joints must be broken, which will allow a

quarter of a brick lap, which will do very well. Leave a space of about 3 feet, then put in a similar piece of wall, and then proceed in the same manner all round the building, arranging the spaces built so that the weight of the building shall be fairly distributed on the old and new work, and taking care to keep the courses of the new work level in order that the joints in the brickwork may work in all right without breaks. By this time the first portions of the work done will be thoroughly set, and the intermediate spaces may be built in like manner. If hoop-iron bond is used, it must run over so as to connect the work together throughout the whole wall, thus making a continuous tie. If any part of the building requires raising the work may be effected by cutting holes in the brickwork and inserting needles supported by shores well fastened. The old foundations may be used for placing the screw-jacks on which are to raise the wall. The brickwork must, of course, be removed at intervals, in order to admit of timbers to be inserted in the wall, which must rest on the heads of the screw-jacks. When the jacks are screwed up sufficiently taught to sustain the building, or that portion requiring to be raised, the needles and shores may be taken



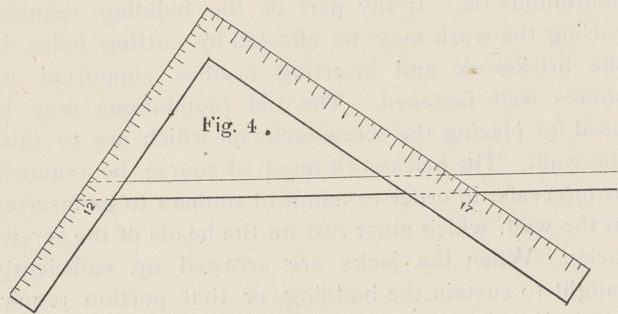
out, and the screws worked until the sunk portion is raised to the required level. The timbers between the jacks may now be cut out, and the underpinning built in as described, and when this work has set properly, the jacks and remaining timber may be removed and the whole work finished up.

From Young Builder :—Isn't there some way by which a “raking” moulding—moulding that joins a horizontal moulding having the same face—can be cut in a box similar to a mitre box?

Ans :—It is one of the impossibles to so cut a moulding having the same face so that a part of it will “rake” and the other part run horizontal and have the junction of the mouldings mitre so that there will be no overwood, unless the horizontal moulding is made to project over so that the cut at the junction of mouldings will form a right angle to the edge of moulding. There is a way, however, by which a moulding can be cut in a box so that it will work a pretty fair joint. Referring to the illustration Fig. 1. Take a common mitre-box and make the angle A B C equal the pitch angle of the roof; draw B D at right angles to A B, making B D equal to the width of the box C J; make D E parallel to A B; make the angle G E F equal to C B A; square across the box from E to H, and from B to K; join E K and B H, then the cuts A B H and F E K will be the cuts

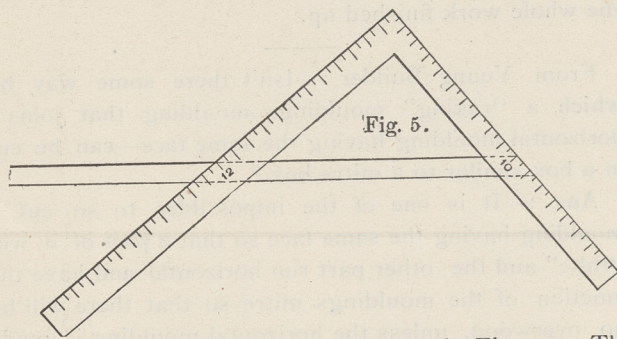
for the rake angles. Always remember that the part of the moulding that is vertical, when in place on the cornice, must be placed against the side of the box when the mitre is cut. To get the cut of the raking mouldings at the peak of the roof, take the pitch angle of the roof A B C, and lay across the top of the box as at O N and L P; then drop the perpendiculars from the points O L P N, and the cuts O N and L P will be the ones required, putting the moulding in the box as shown at R. Of course, the ordinary mitre can be cut in the box by the usual methods.

From Young Builder :—There is a way of getting



the lines for cutting hoppers by using the steel square. Will you kindly publish the methods and oblige?

Ans. :—There are several ways of getting hopper lines by the use of the square, among which is the following: Fig. 2 exhibits the manner of getting the 1st line required, while Figs. 3, 4 and 5 indicate the application. Fig. 2 shows the square with the slant a flare of the hopper, which in this case runs from 12" to 12". By placing a rule across this we find the line to be 17 inches. The angle of the mitre in the horizon is 12 and 12. The base line from the corner of the square to 12 is 12 inches. The pitch line is 5 inches longer than the base line. Add 5 inches, the excess of the pitch line from the base line, and we have 12 and 17 inches of level and mitre. The application of this is shown in Figs. 3 and 4. For a butt joint the sides slant two ways on each angle. The angle on the horizontal is a right angle. The excess of the pitch from the base line on one side is five inches, and on two sides is 10 inches, making an angle or joint of 12



and 10 inches on the square as shown in Fig. 5. The latter figure shows the application of the rule named, the material being square. The rules shown may be easily demonstrated on the bench, by aid of the steel square and a board 10 or 12 inches wide.

From H.E.N., Montreal: I should like to know what sort of paint is supposed to be the best for painting a galvanized roof, the iron having been on for 5 or 6 years?

Ans. : If the roof has no rust spots in it, we would advise a good coat of red-lead and pure linseed oil, then one or two coats of some mineral paint and lin-

seed oil. See that the roof is perfectly clean, with all rust spots rubbed off, if any, before paint is applied. A good job may also be obtained by painting the roof with some one of the oxide paints and linseed oil—give two or three coats.

PROTECTION OF STEEL AND IRON IN CAR AND BUILDING CONSTRUCTION.*

BY CHAS. KOONS.

There is no building material that needs as much protection from the ravages of the elements as steel and iron.

There is no material that will show decay as quick, and become weakened as quickly as this product, when exposed to the natural dampness of the atmosphere in its raw state.

All woods will stand in any kind of weather for some time, without protection, and not show any signs of decay. Most every other metal is free from the effects of moisture and dampness. But iron and its numerous products will begin to show signs of decay if exposed for even one day.

No sooner is the metal made into form, either from forge or furnace, after becoming cooled, than the rust begins its work formed from the dampness of the atmosphere, which penetrates and settles into every nook and crevice; gradually shaping into a reddish coating that readily tells too plainly that a devastating enemy is at work. Rusty-looking steel or iron is an unnecessary evil that should be banished from every mechanic's sight as soon as possible, and especially on the finished product is the painter's worst enemy for the reason that he knows that he cannot do justice to his part of the work unless the entire coating of rust is eliminated before he begins. Thus it takes an enormous amount of labor to prepare an iron surface before any protective coating in the shape of paint can be placed upon it.

All signs of this devastating fiend should be cleaned off and entirely destroyed before commencing with paint coatings. If any of it is left, it is bound to develop and feed upon the paint itself until it comes through the coating, be it one or a dozen coats.

It has also been known to work the other way. It will eat the iron in such a way that it becomes weakened, and in time will cause the whole mass to decay. Thus it shows what a serious thing it is to paint over rust spots.

This is often done through carelessness or ignorance of the workman, not knowing that he is only aiding this enemy to destroy his work.

To rightly protect this material, it should be cleaned and painted just as soon as possible; the grease and dust that naturally gathers in a car shop is also a direct detriment to proper protection for iron and steel, especially for a first coat.

Dust and grease, such as is used in a machine shop, doesn't make a very good paint, and what is added, be it very little, through not being properly cleaned before the paint is applied, lessens the durability just that much.

Vegetable oil paints, no matter how good, will not stick to mineral or animal oil grease; the two won't mix and dry properly. But the worst enemy is the rust germs that are imbedded in the pores of the iron.

These infinitesimal spots that form on the raw iron,

* Paper read before the St. Louis Railway Club, May 16, 1902.

when exposed to dampness, or even the night air, are the paint's worst foe.

To properly clean iron or steel infested by a rust coat takes more time and a great deal more labor than it does to paint it. Thus any one can readily see what a saving there would be if the painter was allowed to get one coat on the work before the dampness in the atmosphere got in its work. And also before it is handled by greasy-fingered machinists.

When one coat is applied, any grease or foreign material that may happen to stick to the surface can be easily cleaned off, and better work done after coating and a more durable job done in the protection that paint gives to this product.

Paint is used for two purposes: To protect the surface against the wear and tear of the elements, and to beautify the appearance of the surface by coloring. But when we take into consideration the serious matter

expecting it to stand. In time it will surely come through, leaving spots and blemishes unsightly to the eye, and destroying everything placed over it.

The further seriousness of this problem is very prominent when we think of how our large structural work is erected. The lack of proper care and the small amount of protective paint used on the iron columns, stringers, framing and whatever goes on on the inside of our sky scrapers, with possibly two coats, and often only one coat of mineral paint, slushed on without any care as to the surface being perfectly clear of rust. This structural iron is all sealed up, as it were, by stone and brick masonry, on the outside, and sheeting and plaster on the inside; but the enclosure is not air tight by any means; and no doubt in the world, if there is any rust painted over, it will gradually eat its way through the paint, and covered up out of sight, nothing



DESIGNS FOR BUILDINGS FOR PURCHASE EXHIBITION, ST. LOUIS, LOUISIANA.

of carelessness and neglect in properly cleaning the work before painting, and the time that the raw iron is allowed to be exposed without attention, we see that protection has another property added to it, and it means something more than merely brushing on a coat of paint.

If there is any science in painting, it is in doing the work so as to give the most durable results. Durability will not be forthcoming when rust and grease are painted over. One is an enemy that will eat into and destroy the very vitals of the strength of the iron, and also find its way out through the paint, sooner or later.

The other, however, may be worked up into the paint coating, will nevertheless weaken the paint, making it anything else but a protective coating.

From a practical standpoint, it would be just as consistent to try to cover a coat of tar with whitewash,

is to prevent it from gradually but slowly feeding upon the iron and steel itself.

Who can question the weakening of this process as it progresses from year to year. It may be slow, but it surely and truly goes on.

When we measure the height of these masses of stone and iron, we wonder if the architect has weighed well the matter of the protection of the material that the building depends upon for support. The stone has to be of a certain hardness; the mortar mixed according to a formula that insures durability; the masonry of the best workmanship; the wood used in the building of the finest that nature's growth can furnish, and possibly the iron and steel of a high grade, but what about the natural decay of the different materials put into the building. The foundations are secure because they are generally made of masonry. The outside walls can be replaced if any defects show from time to time.

The inside finishings and arrangements are constantly being changed to suit this and that occupant, and can also be remedied through defects or weakness showing itself. But that upon which the whole structure depends and is held together is covered up and out of sight, where no one can even see what is taking place.

Whether it needs a coat of paint or not, it matters not, it could not be given. And thus the very vitals of the structure that should be watched with the greatest care are hidden from view and neglected because it cannot be helped.

Some day, some time, there will be a collapse, caused by the iron being eaten away, thereby weakening the structure, causing a strain here and a break there, throwing the whole out of plumb. Is it not a serious matter?

The life of the best paint used on this class of work is from two to three years at the furthest, for two coat work. If there has been rust painted over on the work, it will eat itself out and through the paint in less time. Outside structural work, such as bridges, viaducts and buildings of any kind, should have attention every two years.

In this time paint loses its life, as it were, and should be replenished by a fresh coat.

The moisture and dampness that naturally arise from the earth, and affect the lower stories of our buildings, are almost as destructive as exposure to the outward elements. Although there is no rain to wear it away, or sun to crack and blister it, yet the destruction is more vital because there is no let-up, but a continual eating of the paint from one side and the iron from the other.

Our cellars are never dry, and the natural dampness feeds upon everything that is made from metal of this character, and the few coats of paint that this material is coated with stands a very poor show to keep back the ravages of this monster after two or three years.

The question of a proper protective for this class of work has agitated the minds of chemists and paint makers in this last decade to that extent that it is almost given up, and new ideas are being brought forth and experiments being made on another tack altogether. If the life of oil and pigment is limited to a few years, there must be a coating used that will harden and last as long as cement itself to make it safe, especially for such work as can not be got at after it is once erected. An adamantlike coating that dries something similar to cement would be far preferable than an elastic coating, and the sooner it is brought out the better and safer will our iron structural work be considered.

The question that has always been prominent with mechanics in the paint line, is that there is nothing better than an elastic paint. The more oil used the longer it lasts. This is true as applied to any surface, but more security in preserving iron sealed up and hidden from view demands a more lasting coating.

The expense should not be allowed to enter into the question, when we consider the awful results that may happen, and surely will occur in time with all of our iron structural work.

It has been said that to rightly protect any surface is to give it plenty of paint, and to apply it often.

This will properly apply to all outside exposed work, but not to the work spoken of above. One chance in its history is all that it will ever get.

If it is not properly done and anything happens, it

will not be charged to the painter, or to the paint used on the work; but in all probability to the mechanical skill in erection, or to the engineer in charge of the work, or possibly to the architect who planned and designed the structure. Still the little thing, possibly of an improper protective coating for the iron used on the work, and the improper care in applying it, was the real cause of it all.

It is the little things, the insignificant matters, that we really lose sight of, and think they are of small moment, but they often amount to more than they are credited with.

EXPENSE OF BUILDING IN MEXICO.

Mexican architecture is one of the most conservative in the world, for although the latest materials are utilised, the design is in no way changed to meet the altered circumstances. The population also have the characteristics of their ancestors of some two centuries ago. Although the price of living is low, and rates of wages are accordingly moderate, the eventual cost for the construction of a house in Mexico is equivalent to over three times the price of building the same house in the United States. This is in some measure due, says the Builders' Reporter, to the high price of certain materials, but the chief reason is the indolence of the Mexicans. American contractors engaged in the building business in Mexico have found that one American mason to whom they have to pay 8 dols. per day in Mexican silver will do as much work in bricklaying as twenty Mexicans, who can be hired at \$1.25 a day. Mexican carpenters are paid from \$1 to \$1.25 per day. The hanging of a door is considered to represent a prodigious day's work for a man. It is curious to find that a Mexican stone-cutter is fully as good a workman as an American who receives more than seven times the amount of wages. With the exception of the best work, very little stone is introduced, the local clay being used instead. When kiln-dried the clay serves as terra-cotta ornament, roofing tiles, bricks, etc., and coloured glazed tiles are also formed of it. It is frequently used as stucco and plaster. The walls are frequently decorated by means of coloured washes.

THE WIRE SAW AND PNEUMATIC CHISEL IN STONE WORKING.

A correspondent of The Quarry agrees with the opinion expressed by that journal that the successful working or otherwise of the wire-saw depends very largely on the constituents of the stone it has to cut, as it will work fairly well in one stone and be a total failure in the next. He says: "I have found these failures arise not only with wire-saws but with other stone-working tools. I have been concerned lately in some experiments with pneumatically-driven chisels for stone dressing, and found them work well with many stones, but with some hard stones containing much silica they have been a failure. The stones I am alluding to are at present dressed by hand for paving, setts, &c., successfully, but when a pneumatic chisel, making some 1,000 strokes per minute, was used, it was a failure, as up to date I can get no steel to stand it, although I have tried samples from five leading English manufacturers; in all cases it turned up at the edge after a few minutes' use. After some 30 years' experience in this connection, I have come to the conclusion that stone conversion is rather a "tricky" thing, and every stone must be carefully judged on its merits.

LIFTING AND UNDERPINNING A NINE-STORY WALL.

A remarkable heavy and delicate piece of underpinning under rather unusual conditions has been successfully accomplished on Lower Broadway, New York, where one end of a tall office building adjacent to a taller new office building has been raised nearly 2 inches and underpinned without perceptibly impairing the integrity of the brickwork or stone masonry, plaster or even disturbing the alignment of the elevators and other machinery in service there. The methods employed are thus described by the Engineering Record :

The Guernsey Building at No. 160 Broadway is seven stories high above the street and has a basement and sub-basement below, making nine full stories in all. It is next to the new Maiden Lane Building and its adjacent wall of first-class brickwork is 32 inches thick at

about 5 feet farther than the original footings of the Guernsey Building and imposing a total load of about 7,000 pounds per square foot on the soil. It was calculated that this load would produce a settlement of about $2\frac{1}{2}$ inches, and the levels were fixed to allow for that amount of change after the foundations were laid. This movement in the fine sand would necessarily affect the adjacent wall of the Guernsey Building which was in contact with it, and transmitted a still heavier unit load to its footings. Provisions were therefore made in advance not only to underpin the Guernsey Building with new footings carried down even with the adjacent ones when the latter were built, but to hold the building up and keep it from injury while its footings settled with those of the new building and, when that movement ceased, to seat them solidly on the new footings.



DESIGNS FOR BUILDINGS FOR PURCHASE EXHIBITION, ST. LOUIS, LOUISIANA.

the base, where it is offset on the inside only to a thickness of 5 feet and rests on a footing of excellent concrete 5 feet wide and 3 feet thick. The wall is self-supporting and carries the ends of the floorbeams without columns, and has a total weight of 25 tons per lineal foot. It is about 100 feet long and is offset for a small light court and at one place is integral with a two-story brick vault, 6 feet wide and 12 feet long, which increases the weight at that point to 35 tons per lineal foot. The adjacent wall of the Maiden Lane Building is much higher, is built in contact with it and is carried by the wall columns built into it and seated on cross beams on the ends of grillage cantilever girders, which also carry interior columns at the opposite ends, and are bedded in a solid mass of concrete.

The footings of both buildings are on fine dry sand, those of the Maiden Lane Building being carried down

Timber cribs were built on both sides of the old wall and several feet from it, so as to leave plenty of working space next the wall. They were seated on the cellar bottom inside the building and in pits dug down to sub-grade on the outside, and were connected by timber stringers parallel to the wall. On these stringers about 4 feet apart on centres were set pairs of 15-inch steel I-beam needles of 19 feet clear span with jack screws under the ends, the two beams in a pair being placed in the same vertical plane so as to have a combined depth of 30 inches. An excavation was made under the old wall and its new footing was carried down five feet deeper than before and built up to within about 3 or 4 feet of the underside of the wall and in contact with the face of the wall of the new building, which was carried up to its full height.

After the cement had set a double row of jackscrews

was set on the footing under the wall and screwed up to take the load off the needle beams, which were removed. The jacks were mounted in short vertical timbers, had top and bottom transverse bearing timbers and were placed as close together as possible in the rows. Under the vault there were four rows, all of special 20-ton jacks. A bench mark was established on an interior wall, distant from the outside wall, and level marks on the underpinned wall were checked with it daily by a levelling instrument. No material settlement occurred until after the steel framework of the new building was nearly completed and its walls were partly finished, when it commenced to settle and went down regularly and steadily about 1 5-8 inches in two months and then nearly ceased to settle, only going down $\frac{1}{8}$ inch in five weeks.

The underpinning settled with the new building and the jacks on top it were turned up about $\frac{1}{8}$ inch every week to correspond, so that the upper stories of the old building were kept practically stationary while its footings settled. This was so successfully accomplished that no indication of a crack has been noticed on the walls of the building nor in its long stone lintels, nor in the corners; no trouble has occurred with the machinery and no cracks have appeared in the plaster. The wall has been supported seven months on 75 20-ton special jack screws and 285 5-ton cast iron jack screws, and now that the settlement has practically ceased they will be screwed up about $\frac{1}{8}$ inch high and removed as the new brickwork is built up between new the footing and the old wall.

At the front end of the wall the load is so great that it is dangerous to take out enough jacks to build the new brickwork and a few small cast iron columns will be made and replace a larger number of jacks; the space gained in this way will enable the permanent brickwork to be built enclosing the columns.

In one place the wall was weakened by a large and deep vertical pipe chase cut in it on the inside. The sides of this recess were cut away at an angle of 45 degrees for a short distance at the bottom, and the inclined faces served as skewbacks for the ends of a small two-ring brick invert arch, which was built across the bottom of the recess and bonded with a brick core which filled the lower part of the chase. Under the horizontal lower side of this invert two lines of jacks were set and this section of the wall was jacked up in this way uniformly with the remainder.

At one point a pier in the wall has such a small sectional area that additional support was needed for it while the jacks were removed for building in the brickwork, and a short inclined 12 x 12-inch shore was set on a 5 x 5-foot outside timber platform. The top of the shore was gained its full thickness into the wall and a jack screw was set under the lower end. The pressure in lifting the wall was so great that the bricks bearing on the top of the shore were crushed by it.

The underpinning was in charge of Mr. A. E. Riendau, superintendent for the George A. Fuller Company, who are the contractors for the Maiden Lane Building.

The names applied to the various sizes of roofing slates are very curious, being all founded upon feminine titles. Thus, slates 16 inches long by 8 wide are called "ladies"; "countesses" are 18 inches by 10; "princesses" 22 inches by 12; "Queen's" 26 inches by 14. These names were given to slates by General Wartbourn, the proprietor of one of the largest North Wales slate quarries, about a century ago.

THE BEST FLOORING FOR PORCHES.

A writer in the American Lumberman discusses the question of porch flooring and the best material to be used therefor. He states as a fact that it is fast being recognized by builders that one certain kind of flooring is superior in all necessary qualifications regardless of price. For strength, durability and all manner of effectiveness fir flooring is, in his experience the best material available at the present time.

He finds that a great many of the old porches that were put up a number of years ago were laid with flooring thicker than inch stock. This is not necessary, for rarely, if ever, does a porch floor wear down even to the matching. Inch stock is just as serviceable. A great many architects will specify white pine, and were it an easy matter to get the clear white pine necessary for a porch floor at a price that would allow its general use for that purpose there would be no need to look further. However, from a wearing standpoint, white pine is softer and not so durable as fir. Cypress is much in use in the south, but the distance from the market and the consequent high freight rates make it an impracticable proposition in the north. Yellow pine is also used to a considerable extent, and its large use by railways is evidence that it is serviceable. Distance from the market is an objection that has also to be overcome with yellow pine.

Besides price and durability there is another consideration, and that is the quality of holding paint. Here again, fir is shown to be as good as, if not superior to the other woods mentioned. It is always better to apply the paint to almost any wood that is to be exposed to the weather, while it is being put on, so that all parts that are likely to become wet will be protected. In laying any matched flooring on porches it is well to apply the paint as each piece is put down so the tongue and groove will have protection as well as the top surface.

Something has been said of the distance from markets as it affects the price of the material. On a basis of equal freight per mile, both yellow pine and cypress would have an advantage over fir in the Mississippi valley, but freight rates east and west on the trans-continental lines are lower proportionately than on the lines running north and south, and fir has the advantage, not in actual freight figures, but in delivered quotations, and even lower rates from the west coast are looked for before long.

All the requirements necessary for a good porch flooring are found in fir. It is sufficiently hard to make its wearing qualities as good as those of most woods that can be used. It is harder than most soft woods and wears better than some of the hard woods. It is thoroughly dry when it reaches the consumer, and does not shrink, swell or warp. It absorbs paint and holds it, and the best clear, straight grained stock can be had in plentiful quantities at prices that make it the cheapest as well as the best for porches in all points west of Lake Michigan and north of a line drawn through Chicago.

Messrs. F. C. Hirsch & Co., 228 St. James Street, Montreal, representing a nucleus of capitalists, are proposing to supply an improvement in sanitary arrangements in office buildings, residences, public buildings, etc. Mr. Wilkes, the head of the firm, should have no difficulties or obstacles put in his way in obtaining all the privileges he requires from municipal authorities, if, as he states, the scheme will benefit the community at large.

GLASS BRICKS.

M. Jules Henrivaux, who was formerly director of the great French glass factory at Saint Gobain, has become the advocate of a new building material, for which he anticipates sooner or later a prodigious demand. It is a brick made of what he calls stone-glass. The strength of it is not surpassed by any of the building stones, for it can sustain as much weight as a granite block. One of the stone-glass bricks has been found irresistible to blows with a hammer. Another advantage is that colours of all varieties can be imparted to the brick, and will enable it to be used for ornamental purposes. According to M. Henrivaux, glass can be employed in buildings from the foundations to the roof. Stone glass is also applicable to tubes for air, gas, electric wires, etc. It is needless to say the use of glass bricks has been recommended for many years, but it has never been attempted except on a limited scale. It is remarkable that, while glass is suggested to serve instead of stone and brick, thin stone has come into popularity in Germany as a substitute for glass in factory windows.

A SUGGESTION FOR BUILDERS.

An important contribution to building ideas has been made by Mr. F. A. Talbot when he asks, "Why should our suburban building plots be laid out in long, irregular, serried rows of houses?" He answers it by telling how two Buxton architects have devised an "alternative, novel, and effective system." They urge that instead of being erected in streets, houses should be built round the sides of the particular plot, leaving the centre open, in much the same way as we lay out squares. The houses might be detached, semi-detached, or built in blocks, and each should possess an individual design, so that a pleasing variety of styles of architecture might be obtained. It is also pointed out that this mode of building does not use up more land than building in rows, but that exactly the same number of houses of a given size can be erected on a certain plot as if they were laid out in streets in the orthodox fashion. The suggestion is one that not only the projectors of garden cities, but even enterprising suburban builders might experiment upon with advantage.

A FORTY-ONE TON MONOLITH.

The first of the eight large stone pillars that are to adorn the front on Chambers street side of the new Hall of Records was placed in position recently. The monolith is 36 ft. long, 4 ft. 2 in. in diameter, and weighs 41 tons.

The stone was brought here from Hallowell, Me., where it had to be trucked two miles to the railroad, put on a freight car, run to the Harlem River, transferred to a lighter and taken to pier "A". Here there was a delay of 24 hours in deciding whether the pier would stand the heavy weight. The monolith was finally landed successfully and was hauled to Chambers street by a score of horses. Every manhole on the way that the load passed over was cracked by its enormous weight. Two other attempts have been made to get the stone into position. Two engines, two booms, one of steel, and a double derrick had to be used to swing it on to its granite base.—Stone.

LEGAL.

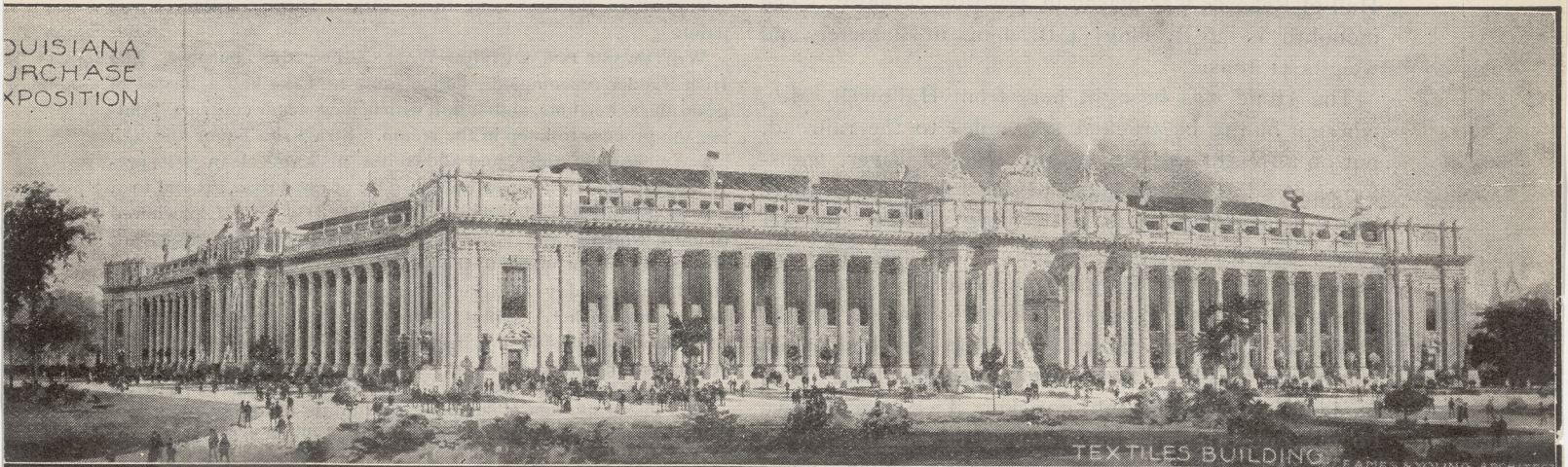
GABY v. CITY OF TORONTO.—Judgment on appeal by defendants from judgment of MacMahon, J., in favor of plaintiff in action tried at Toronto, brought by the widow and administratrix of Levi Gaby, late of Richmond Hill, deceased, to recover damages for injuries which caused his death. The trial Judge found after a lengthy review of the evidence that deceased left the Commercial Hotel, on Jarvis street, in the City of Toronto, on 19th November, 1900, at 8.30 p.m., in a sober condition, and that his body was found between 7 and 8 o'clock the next morning in a hole, 4½ feet wide and nearly 8 feet deep, dug three weeks before by the contractor for masonry work of the new St. Lawrence Market, added as third party; that the hole was not properly guarded, and was sixteen feet down from the building wall, and on the west side of Jarvis street, and deceased fell into it, and that under his contract with the defendants the third party, James Crang, was liable to them. Defendants' appeal dismissed with costs.

According to the contract form in general use, says the London Builders' Reporter, the authority of the architect for the contractor to vary from the drawings or specifications is sufficiently proved by any writing or drawing given by him, or by any subsequent written approval by him. It, however, the architect certifies that a certain sum is due in respect of extras, though no order in writing as required by the contract has been given, the certificate is accepted by the Courts as a sufficient substitute. This fact has been again upheld in the case Goodwin v. Longton Building Society, which came before Judge Mulholland at Hanley. The plaintiff, a builder, brought the action to recover £38. 3s. 9d., balance of an account respecting a building contract. The Longton Building Society were the mortgagees of Warwick Works, which the plaintiff had entered into a contract with the executors of the late proprietor to restore after a fire. The contract price was £730, and the work was carried out under the direction of an architect. In accordance with the architect's certificate, the builder received payment in four instalments, which made a total of £710. The builder then claimed the balance, viz., £20, and also £18 3s. 9d. for extras. The architect testified to the work having been done satisfactorily, and that the extras had been executed by his instructions. The defendants maintained that they were not liable for extras which had not been mentioned in the contract, and they paid the £20 balance into Court. A verdict was given in favour of the plaintiff for £38 3s. 9d., the full amount of the claim.

An advertiser's space in a reliable medium is the means of introducing him to a large number of prospective purchasers. On what he says and how he says it, depends to a large extent whether or not he will profit by the introduction.

We quote from the Scientific American of several years ago the following formulae for a fireproof dip for wood shingles: Dissolve in a barrel of hot water 20 pounds of zinc sulphate, 20 pounds of powdered alum, 8 pounds of caustic potash, 8 pounds of oxide of manganese, and add 8 pounds of oil of vitriol. Pack the shingles loosely into another barrel and fill up with the liquid, keeping the shingles under the mixture by means of a weighted cover. Fill the first barrel also with shingles, and allow them to soak for several hours, then take them out and pile away to dry. Repeat this operation until all the shingles are impregnated with the mixture. Use rubber gloves for handling the shingles, and when laid on the roof coat them with a suitable oxide of iron paint.

WHITEWASH FOR OUTSIDE WALLS.—For this purpose The Irish Builder recommends the following:—Take half a bushel of good unslacked lime, and slake it with boiling water covering it during the process to keep in the steam. Strain the liquor through a fine sieve or strainer, and add to it a peck of clean salt previously dissolved in warm water; 3 lb. of good rice, ground to a thin paste and stirred in while boiling hot; ½ lb. of powdered Spanish whiting, and 1 lb. of clean glue, previously dissolved. Add 5 gal. of hot water to the mixture, stir well, and allow to stand for a few days, covered from dirt. The whitewash should be put on quite hot. A pint of this mixture will cover a square yard upon the outside of a house if properly applied, and will retain its brilliancy for years. The growth of lichen is an indication that the roughcast contains too much moisture. A wash with a dilute solution of sulphuric acid might kill the growth and would not injure the wall; but probably a more permanent cure would be to give a coat of fluate, or any of the other soluble silicates made for the purpose.



DESIGNS FOR BUILDINGS FOR THE LOUISIANA PURCHASE EXHIBITION, ST. LOUIS.

THE SLATE INDUSTRY OF NEWFOUNDLAND.

As the result of differences between the proprietors and workmen at the Penhoyn quarries in Wales, resulting in the closing of the quarries some two or three years ago, the attention of Welsh quarrymen has been directed to the slate deposits of Newfoundland. Several of these deposits have been purchased and development work commenced. A Newfoundland correspondent of the Montreal Gazette writes on the subject as follows: "It looks as if the export of slate were about to become an important industry amongst us. A Welsh gentleman, Mr. O. J. Owens, arrived here on Monday last from Wales to commence the work of development on a newly-discovered slate quarry at Bay of Islands. He has a life-long experience in the work and after examining the property gave it as his opinion that it was the largest and most valuable deposit in the world. The original owner of the claim was R. G. Reid, railway contractor. He disposed of it to Mr. Owens on very reasonable terms, influenced principally by a desire to bring about mineral development along the line of railway and induce a large number of immigrants to come from Wales and help to build up and people this part of the country. Mr. Owens, in order to help on the furtherance of these views, has published a book on the subject of Newfoundland's slate deposits in the Welsh language, and has circulated it widely among his countrymen. The slate quarry at Smith's Sound, Trinity Bay, is now a well-established industry, and is worked principally by Welshmen, who say there is a great future for slate in Newfoundland. Last year 2,000 tons, equal to 6,000 squares, valued at \$22,500, were exported. It was shipped to London and Newcastle, where a ready sale at remunerative prices was obtained. The shipping facilities are remarkably easy and vessels of any size can lay alongside within a stone's throw of the quarry, and in perfect safety. The quarry is of immense proportions and there is sufficient material in sight to last for generations".

BUILDING IN MONTREAL.

There is a revival of activity in building in Montreal this year. The increased cost of material and labor is estimated by the Building Inspector at about 15 per cent., but this apparently does not retard to any extent building enterprise, being presumably more than offset by prosperous commercial conditions. The record of new buildings since the first of the present year is given as follows: In January, permits were issued for buildings to the value of \$32,615, twenty-eight for dwellings, six for stores, two factories. In February, the value was

\$33,500, their being thirty-five dwellings, five stores and a warehouse. In March, the value was \$499,400, there being seventy-two dwellings, twenty-one stores, three churches, three warehouses and six factories. In April, there were two hundred dwellings, twenty-eight stores, three warehouses, eight factories, one office building and a church, value \$536,541; in May 160 dwellings, six stores, one factory and town office buildings, value \$262,240.

BLACK PAINTS FOR HEATED SURFACES.—Ordinary paints, when coated on any heated surfaces, as boiler chimneys, smoke boxes, cylinder ends, usually blister and fall from the work. The following preparation will be found very efficient for this class of work: Procure 3 lbs. lampblack, 3 lbs. black lead, 1 lb. black oxide of manganese, 1 pint japan gold size, $\frac{1}{2}$ pint turpentine, and 1 pint boiled linseed oil. Powder the black lead and mix all the ingredients well together to a uniform consistency and apply two coats as ordinary paints. This preparation will be found very durable, and will not turn white or grey when exposed to excessive heat, the same as ordinary black paints. Procure 2 lbs. black oxide of manganese, 3 lbs. black lead, 9 lbs. terra alba. Mix well together and pass through a fine sieve, then mix to the required consistency with the following preparation: 10 parts silicate of soda (soluble glass), 1 part glucose, 4 parts water. This may be used in a similar manner to the above. It is invaluable to ship and locomotive painters.

ART GLASS

Of Every Description.

Memorial Windows

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CANADIAN ARCHITECT AND BUILDER

A Monthly Journal of Modern Constructive Methods,

(With a Weekly Intermediate Edition—The CANADIAN CONTRACT RECORD).

PUBLISHED ON THE THIRD WEDNESDAY IN EACH MONTH IN THE INTEREST OF
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Prices for advertisements sent promptly on application. Orders for advertisements should reach the office of publication not later than the 12th, and charges of advertisements not later than the 5th day of the month.

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Contributions of value to the persons in whose interest this journal is published are cordially invited. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

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Coring a chimney consists in clearing it of any projections left by the pargetting. "Notes on Building Construction" says: "While a chimney flue is being built it is advisable to keep within the chimney a bundle of rags or shavings, called a sweep, in order to prevent mortar from falling upon the sides of the chimney, and after the flue is finished a wire brush or core should be passed through the flue to clear away small irregularities and to discover any obstruction that may exist in the flue."



Owing to its remarkable hardness, elasticity and durability, it rivals the best wax finish, but is free from its unpleasant slipperiness.

Moving furniture or boot heels do not leave white marks, nor does soap, mud, or water destroy its fine appearance. It dries dust proof in about three hours.

Being very penetrating it closes the pores of the wood against disease germs, making it invaluable for hospitals, asylums, and similar institutions.

Architects patronize home industry and specify Granitine Floor Finish.

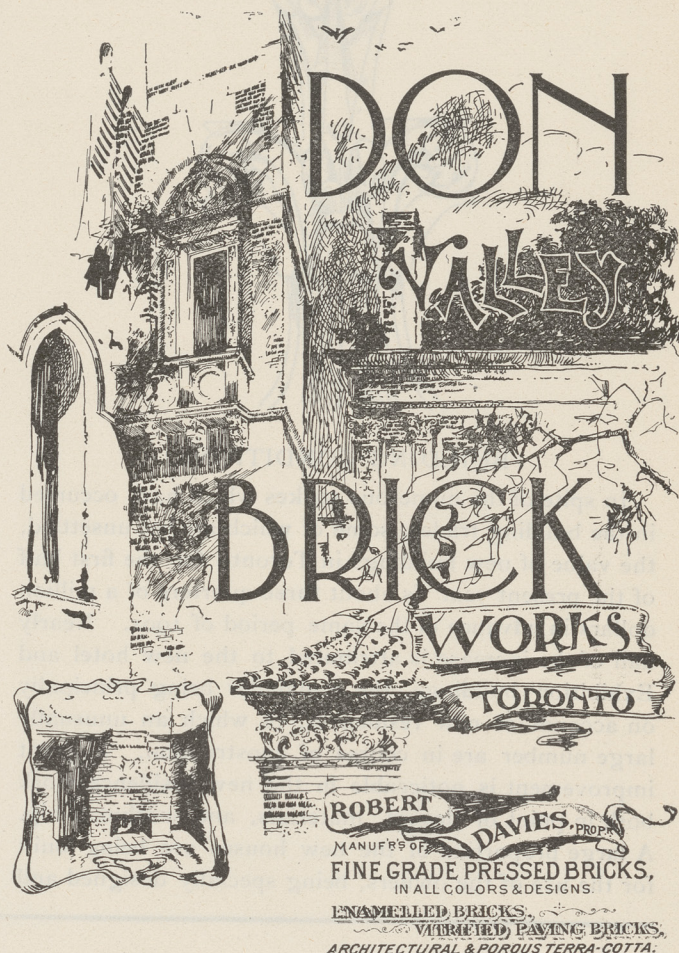
BY THE WAY.

The importance of careful reading of specifications by contractors when submitting tenders was emphasized in Toronto recently. A contractor tendered for certain painting and glazing work for one of the public schools, and was given the contract. He afterwards discovered that in looking over the specification he had read "class room" for "glass room," and in consequence was out more than one hundred dollars in his calculation of the amount of work to be done. He sued the Public School Board to recover the amount, but the Judge held that he was put out of court by the contract.

x x x

A Canadian gentleman who has lived fourteen years in Chicago, told me the other day some interesting facts regarding the municipal government of that city. He states that with the exception of the parks and the boulevards which form part of the park area, no means are adopted to clean the streets. The parks and boulevards are kept in perfect condition by the money and men provided by the county authorities and are much admired, while by contrast the streets opening into the boulevards are disgracefully dirty. In the face of these conditions healthfulness of the city is said to be maintained by the winds which constantly sweep across it, induced by differences in temperature between the low-lying sandy soil on one side and the water of Lake Michigan on the other. From this cause Chicago has been named the "Windy City." Heretofore the City Government has been largely in the hands of the saloon keepers and appearances would indicate that the revenue from taxes has found its way into other than legitimate channels. The action of several wealthy young men

in offering themselves for election to the City Council is an augury of improved conditions for the future.



The Canadian Bridge Co., Limited

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... MANUFACTURERS OF

STEEL BUILDINGS, ROOF TRUSSES

Railway and Highway Bridges and Structural Steel and Iron Work of all descriptions
Estimates furnished upon application.

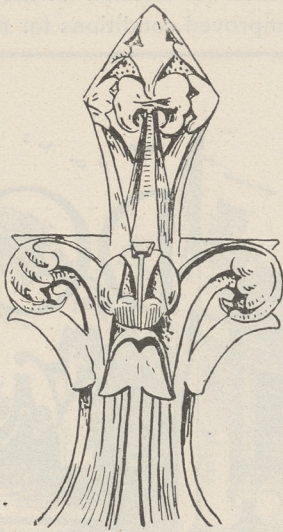
The Noiseless Valve

Emptying the Tank in the "Morrison" Low Tank Closet Combination is a feature possessed by no other low tank. This

feature in itself makes this closet the most desirable of any on the market. "Morrison" Low Tank Closets are handsome in appearance, require little space, are very positive in action and do not get out of order easily.

Fuller particulars sent on request.





BUILDING CONDITIONS.

In spite of the numerous strikes which have occurred in the building trades, some of which are yet unsettled, the value of new buildings in Toronto for the first half of the present year is about three quarters of a million dollars in advance of the same period of 1901. Nearly half of the increase is attributed to the new hotel and Exhibition buildings, the remainder being principally on account of new residences, of which an unusually large number are in course of construction. A great improvement is noticeable in the new residence work both in point of design, materials, and workmanship. A large proportion of the new houses are being built for the use of the owners, being specially designed and

superintended by architects. A considerable amount of speculative building is being done in localities where land may be obtained at a moderate price, but even this work is designed by architects, and is not in the same class with the shoddy productions of speculative builders of ten years ago.

It is gratifying to learn that in Montreal, where building operations have been conducted on a somewhat restricted scale for two or three years past, a revival of enterprise in this direction has set in, while the cities and towns throughout the entire country are likewise witnessing improvements on a scale in keeping with the commercial prosperity now prevailing.

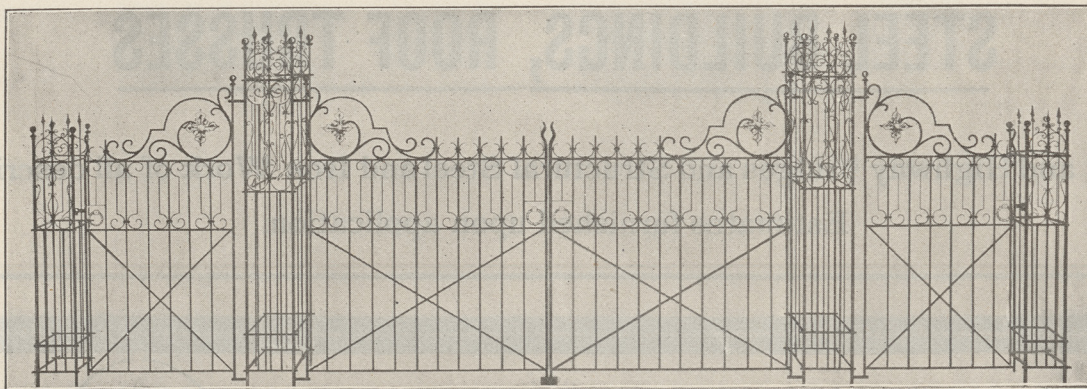
It is to be regretted that workmen and employers cannot unite in an endeavor to make the most of the present favorable conditions, which cannot be expected to continue indefinitely. The numerous strikes to which reference has been made will, if continued, prove the precursor of another period of commercial depression, tempting as they do to render capital timid. We are pleased to note the general condemnation of the Plumbers' Union of Toronto for having violated their agreement with the Master Plumbers. If there does not exist a sufficient sense of honor on the part of the Unions to live up to the terms of a definite agreement such as the one in question, there is small hope that satisfactory relations can in future be maintained between contractors and workmen in the building trades.

Any kind of an advertisement may be better than none at all—but a good one is many thousand times better and costs little more.—The Advisor.

Canada Foundry Company, Limited

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DESIGN NO. 23a.

Ornamental Wrought Iron Fences

From New and Modern Designs.

Architectural Ironwork of Every Description

Grilles, Railings, Elevator Cars and Enclosures,

Staircases, Fire Escapes, Fire Dogs, Fenders, etc.

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THE MONTREAL SILICATE BRICK COMPANY,
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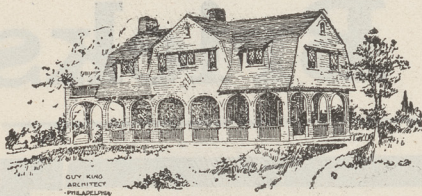
Under the Dominion Companies Act letters patent have been granted to the above company for the purpose of manufacturing building and paving brick and for other purposes more fully set forth. The Company purpose entering into the manufacture of brick by a process that is entirely new, to this country, although it has been introduced for about ten years, with great success, in Germany, Norway and Sweden, and has lately found a strong foot-hold in the United States, there being now four extensive plants there in full operation. As described by Mr. George J. Sheppard of the firm of Charles Sheppard & Sons the extensive brick manufacturers of Montreal, who have been known to the building community for the past 45 years, the process is a very simple one though very effective. The materials used are sand,—any clear sharp sand—and five per cent. of thoroughly slaked lime. The bricks are made on powerful presses similar to those used in the dry press process, but after they leave the press, comes the great difference. Instead of the expensive and tedious methods extending to a period of several weeks in drying and burning under which clay or shale brick have to be made, Silicate brick are wheeled on flat cars each holding 2,500 bricks into an immense steel cylinder 6' 6" in diameter and 40 ft. in length containing 10,000 brick. The cylinders are then hermetically closed and live steam introduced at 120 to 150 lbs.

to the square inch. The bricks are allowed to remain under this baking process for twelve hours and are then wheeled out to cool and when cooled are ready for use in any building. A part of the process includes the introduction of tanks under the cars of brick containing fresh lime. The chemical action arising from the steam and lime and the great pressure used hardens the bricks; when exposed to the air they continue to harden becoming virtually a solid mass of silica.

The process is fully protected by patents both in Canada and the United States. The Montreal Company have acquired rights to manufacture in the Province of Quebec and will erect a large factory in that city.

Highly satisfactory experiments have been conducted at the establishment of Messrs. Charles Sheppard & Sons since last September, and that firm is so thoroughly satisfied the new process is bound to revolutionize the brick industry, that they have taken a prominent part in the organization of the Company, and will conduct its future management, dividing the departments between Mr. George J. Sheppard and Mr. Edmund Sheppard.

At a meeting of the shareholders held on Wednesday June the 25th. the following officers were duly elected, to fill office for the ensuing year viz:—Messrs. David Robertson, President; George J. Sheppard, Vice-President & Managing Director; Hon. Senator Kirschhoffer, Brandon, Man., Alfred Joyce, John McLean and Charles W. Trenholme, Directors.

CABOT'S
CREOSOTE SHINGLE STAINS

The Original and Standard Shingle Stains are made only by **SAMUEL CABOT**, of Boston, Mass. Every package bears his trade mark, and every gallon is guaranteed. Used and proved in every climate for nearly twenty years. Also

CABOT'S
Sheathing and Deafening "Quilt"

the most perfect insulator of heat and deadener of sound on the market. Decay, moth and vermin-proof, and unflammable.

Samples, Catalogue and full information upon application to the manufacturer or his

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A Weekly Journal of advance information and public works.
The recognized medium for advertisements for Tenders.

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Hayes Patent
Steel Lathing

HAS POINTS IN ITS FAVOUR
THAT YOU CAN'T AFFORD TO
OVERLOOK.

In the first place it requires less mortar, and can be more quickly applied than others—most valuable advantages that have been proved by conclusive tests.

Then the sheets are not weakened by stretching in manufacture—they clinch and hold the mortar firmly, making the most rigid lathing you can find.

This gives a fire, water and vermin proof protection, that is really more economical in cost than other styles.

For covering pipe chases, hot air flues, etc., it is extensively used and proves invaluable.

Read it up in our catalogue and you'll fully understand its superiority.

METALLIC ROOFING CO.,

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MONTREAL

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EXPANSION OF CONCRETE.

Recent experiments by Prof. W. D. Pence at Purdue University, go to disprove the hitherto accepted theory that the co-efficient of concrete is similar to that for the expansion of steel. It was established by the experiments that the co-efficient of expansion of gravel concrete is 0.00000 54 per degree Fahr., and of broken stone concrete 0.00000 55 per degree Fahr. The co-efficient of expansion of steel is generally taken as 0.00000 65 per degree Fahr. That means about 15 per cent. less for concrete than for steel. In the case where steel beams and concrete are combined, the difference must produce stress in both materials. Concrete of course cannot sustain tensile stresses equally with steel, but Professor Pence holds that the stress per degree during changes of temperature would not exceed a quarter of a pound per square inch, and if there was a very great change of temperature, say 100

deg., the stress would not be more than 25 lbs. per square inch. In Chicago provision is made for expansion in concrete in retaining walls by having a joint at every 50 or 60 feet. But in small walls it is advised that joints should be provided at every 30 feet or thereabouts. Professor Pence believes that temperature stresses cannot be serious for the following additional reasons:—(1) The chief range of temperature from that which prevailed at the time the concrete first adhered to the surface of the steel is downward, producing a compressional stress in the concrete section, since the steel contracts more rapidly than the concrete. (2) The changes of temperature in the structure will be gradual, owing to the fact that concrete is a poor conductor of heat. (3) Reinforced concrete beams will sustain on the tension side, without rupture, a proportionate distortion of from ten to twenty times that at which the simple concrete beam would fail. (4) Interior stresses are relieved more or less by the slipping of the metal bars in the concrete.

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Milton**ARCHITECTURAL TERRA COTTA**

We make a Specialty of Ornamental Brick and Terra Cotta Mantels

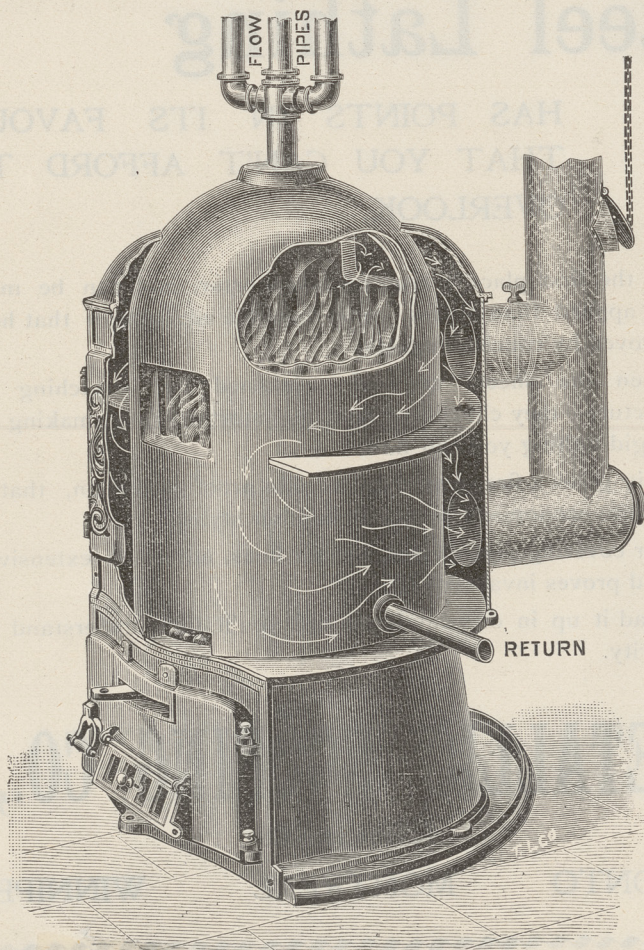
High-Grade Pressed and Ornamental Bricks in red, buff, yellow, salmon, brown, and Special shades. : : :

Pressed

Our products have a wide reputation and are specified by leading architects

THE MILTON PRESSED BRICK CO., LIMITED

Works and Head Office: MILTON, ONT.

Bricks**A HEATER WITHOUT A JOINT**

Is What we Offer You in

THE PRESTON HOT WATER BOILER

The advantages of this feature in its construction are self-evident. There can be no leaks on account of bad packing, nor is there any opportunity given for expansion or contraction to open up joints. The water chamber is made in ONE SOLID CASTING, and so designed as to give a VERTICAL CIRCULATION. By making use of this NATURAL LAW we greatly increase the efficiency of the heater.

A post card to us will bring our booklet with full description.

CLARE BROS. & CO.,
Preston, Ont.

WORDS OF APPRECIATION.

Mr. A. J. Griffin, of Dauphin, Man., writes as follows: "I am pleased to see the improvement you are making each year in THE CANADIAN ARCHITECT AND BUILDER. The Journal is of great benefit to us away out in this Northwest country. Building in Dauphin is not as brisk as it has been, but what is done now is of a far better class than before."

"More School Houses" is the title of a new pamphlet issued by

Mr. Samuel Cabot, of Boston, showing over twenty new and important School buildings in which Cabot's Deafening Quilt has been employed. This has come to be regarded as the standard material for the purpose.

The report comes from St. Johns, Que., that the Macdonald potteries at that place which ceased operations several years ago, have been purchased by a United States Company. It is said to be the intention of the new owners to equip the works with modern machinery and manufacture porcelain goods, enamelled baths, etc. on a large scale.

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☞ The "ELEPHANT"
Brand of White Lead
has stood the test for
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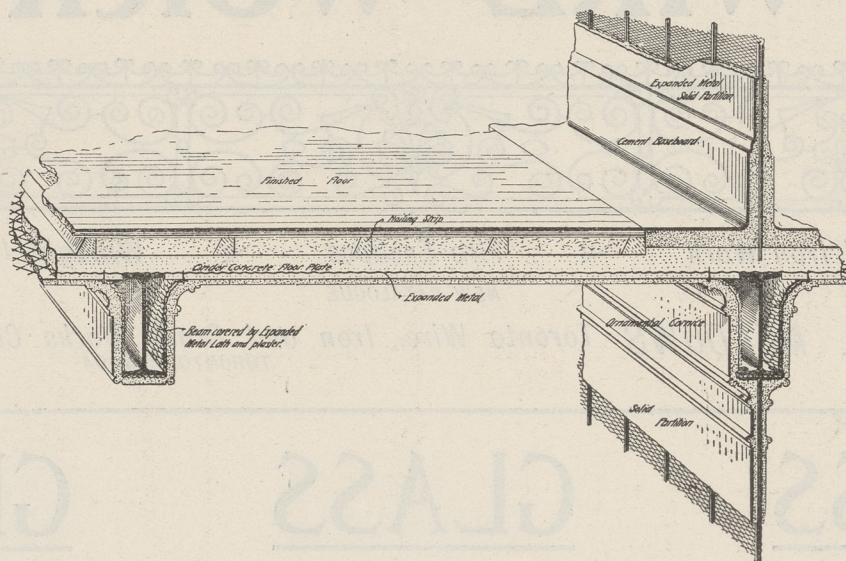
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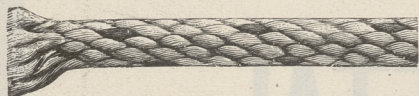


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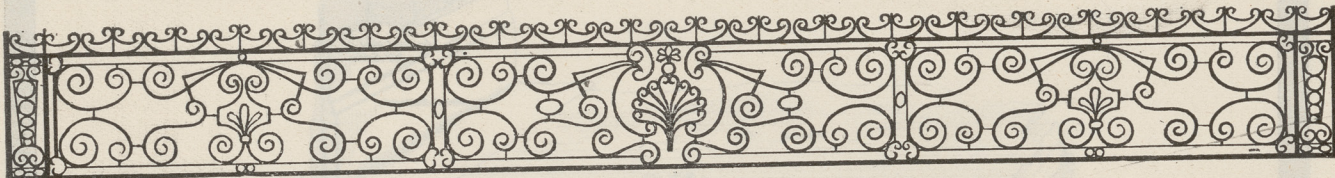
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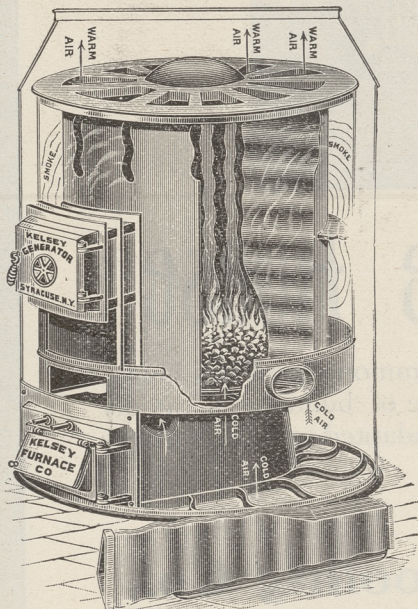
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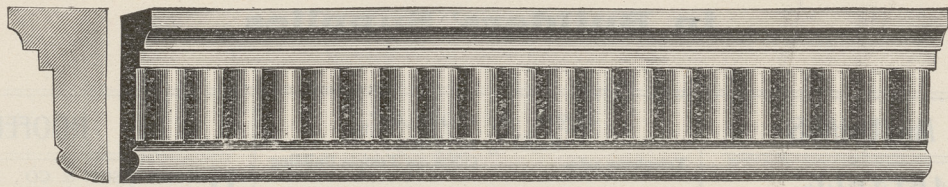
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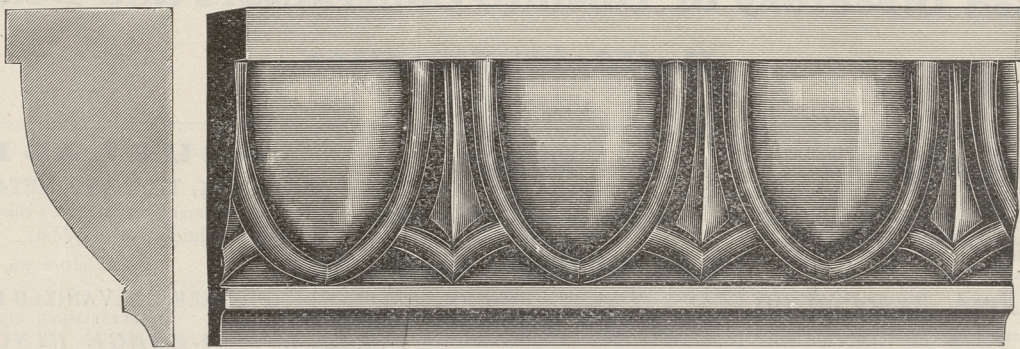
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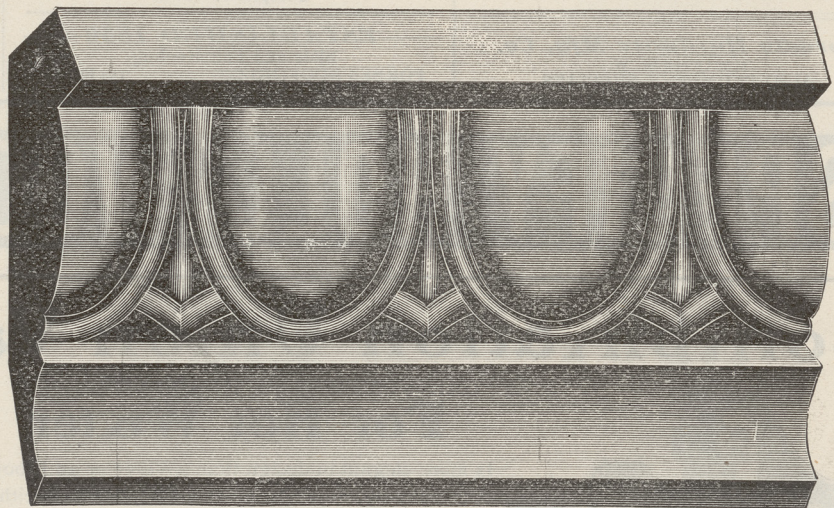
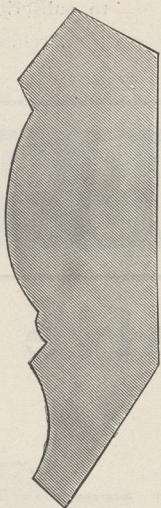
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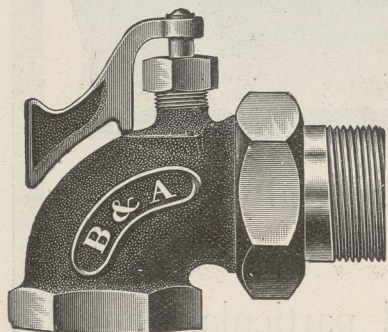
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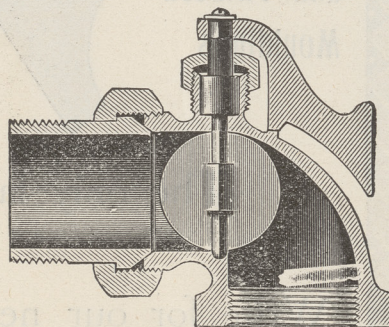
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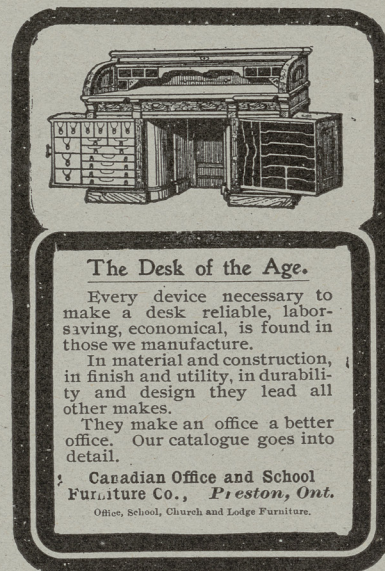
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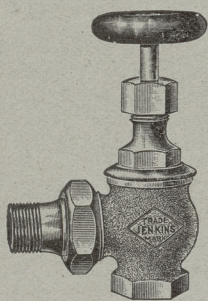
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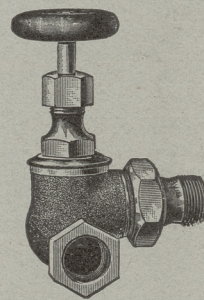
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